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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,334	06/02/2005	Pekka Strommer	PLA077-825508	3452

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EXAMINER	
MIDKIFF, ANASTASIA	

ART UNIT	PAPER NUMBER
2882	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/537,334	STROMMER ET AL.	
	Examiner	Art Unit	
	Anastasia Midkiff	2882	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-29 and 31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,8,9,12,14-19,24,26-29 and 31* is/are rejected.

7)☒ Claim(s) *4-7,10,11,13,20-23 and 25* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 19 October 2007 has been entered.

Claim Objections

Claims 1-29 and 31 are objected to because of the following informalities:

In Claim 1, the claim is directed toward a method, wherein the language should be replaced with a proper method recitation format, i.e., "A digital mammography imaging method, said method comprising the steps of" followed by method steps that are separated by tabs. The examiner suggests using the tabbed limitation format, as used in Claim 16, for the individual method steps of Claim 1.

With respect to Claim 16, line 11 recites “an object to be imaged”, and line 17 recites “the beam", wherein there is insufficient antecedent basis for these limitations in the claim. The examiner suggests replacing “the” with --an-- or --a--.

Claims 2-15, 17-29, and 31 are objected to based on their dependency upon Claims 1 and 16.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 26 and 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to Claim 26, line 4 recites "said pendulum arm", wherein there is a lack of antecedent basis for this limitation in the claims. Claim 26 depends from Claim 18, and the examiner suggests that perhaps claim 26 should depend from Claim 23, in which a pendulum arm is recited.

Claim 27 is rejected based on its dependency upon Claim 26.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 8, 9, 12, 14-19, 24, 28, 29, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent to Hseih (US 6,292,531 B1) in view of U.S. Patent Application Publication to Francke et al. (US 2003/0174806 A1).

With respect to Claims 1 and 15, Hseih teaches a digital mammography method (Abstract), in which:

- detecting radiation that has passed through an object on at least one sensor (18, 504), said object being a breast (12), each of the at least one sensor containing at least one sensor module (Column 3, Lines 1-24);
- wherein the at least one sensor module (18, 504) contains one or more pixel columns which receive image data (Column 3, Lines 6-9);
- arranging the object (12) to be imaged to be essentially motionless and scanning across said object with a beam which originates from a radiation source (14) having a focus (Column 3, Lines 55-58, and Figures 1-5 and 7);
- wherein the focus of the radiation source is essentially motionless in space (Column 4, Lines 42-43, and Column 5, Lines 42-45);
- limiting the beam to be narrower than the object (12) to be imaged and adapted essentially to an active surface of the at least one sensor (Column 5, Lines 36-41);
- moving the at least one sensor (18, 504) in synch with the scanning movement of the beam (Column 3, Lines 33-44) while at the same time the active surface is kept essentially at right angles to the beam on a plane formed by the scanning movement of the beam (Figures 1-5 and 7); and,

- implementing the movement of the at least one sensor (18, 504) by continuously adjusting the distance of the at least one sensor from the radiation source (Column 3, Lines 24-32) in such a way that the trajectory of the at least one sensor (18, 504) underneath said breast (12) is an essentially linear movement in the direction of the scanning movement of the beam (Figures 1-5 and 7).

Hseih is silent with respect to the support of the breast.

Francke et al. teaches a digital mammography imaging method in which:

- a human breast is supported by a radiolucent compression structure (Paragraphs 37) so that x-rays pass through said breast (Paragraph 47), said structure comprising an essentially plane-like upper compression paddle (84) and a shelf (85) having an essentially plane-like surface (Figure 1); and,
- wherein an x-ray sensor module (86) for receiving image data on the breast (Paragraph 35) is located beneath the shelf (Figure 1);

so that mammographic imaging can be provided with the breast(s) compressed (Paragraphs 37 and 60-61).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ compression paddles as breast support, as demonstrated by Francke et al., in the mammography method of Hseih, in order to provide a clearer x-ray image of the breast through the x-ray absorbing fat and glandular tissues of the breast, as suggested by Francke et al. (Paragraphs 60-61).

With respect to Claim 16, Hseih teaches a digital mammography imaging apparatus (Abstract), which includes:

- a radiation source (14);
- a sensor arrangement (18, 504) for detecting radiation, which arrangement contains at least one sensor formed of at least one or more sensor module (Column 3, Lines 1-10), said at least one sensor module containing one or more pixel columns which receive image data (Column 3, Lines 6-9);
- an object to be imaged, said object being a breast (12), located within the area between the radiation source (14) and the sensor arrangement (Figure 1);
- means (508) for limiting a beam from the radiation source essentially according to an active sensor surface of the said sensor arrangement (18, 504; see Column 5, Lines 36-41);
- means (28) for moving the beam across the object being positioned to be imaged (Column 3, Lines 24-38 and 55-58, Column 4, Lines 42-61, and Column 5, Lines 42-45); and,
- means (28) for moving the said at least one sensor of the at least one sensor arrangement (18, 504) in synch with the scanning movement of the beam (Column 3, Lines 33-44) and keeping the said active sensor surface essentially at right angles to the beam on a plane formed by the scanning movement (Figures 1-5 and 7);

- wherein the imaging apparatus includes means (28) for adjusting the distance of the at least one sensor (18, 504) from the radiation source (Column 3, Lines 24-32) in a way that the trajectory of the at least one sensor in the direction of the scanning movement of the beam becomes essentially linear and takes place beneath the breast (Figures 1-5 and 7).

Hseih is silent with respect to the support of the breast object.

Francke et al. teaches a digital mammography imaging apparatus

- a human breast is supported by a radiolucent compression structure (Paragraphs 37) so that x-rays pass through said breast (Paragraph 47), said structure comprising an essentially plane-like upper compression paddle (84) and a shelf (85) having an essentially plane-like surface (Figure 1); and,
- wherein an x-ray sensor module (86) for receiving image data on the breast (Paragraph 35) is located beneath the shelf (Figure 1);

so that mammographic imaging can be provided with the breast(s) compressed (Paragraphs 37 and 60-61).

It would have been obvious to one of ordinary skill in the art at the time of the invention to employ compression paddles as breast support, as demonstrated by Francke et al., in the mammography apparatus of Hseih, in order to provide a clearer x-ray image of the breast through the x-ray absorbing fat and glandular tissues of the breast, as suggested by Francke et al. (Paragraphs 60-61).

With respect to Claims 2, 3, 17, and 18, Hseih further teaches that said at least one sensor (18, 204) is translated by a motor controller (32; see Column 3, Lines 32-38), but does not specifically teach at least one actuator and that at least a part of the movements of the at least one sensor is implemented by mechanically forced control.

It would have been obvious to one of ordinary skill in the art to use an actuator to convert electrical energy from the controller to mechanical energy to move the at least one sensor in the apparatus and method of Hseih and Francke et al., since actuators are known to perform such an energy transition for electrical devices with moving parts to provide mechanical force to move said parts from electrical energy.

With respect to Claims 8, 9, 24, and 28, Hseih further teaches that the scanning movement of the beam is realized by moving a collimation element (508) attached to the source (14) that limits the beam (Figure 7), said source being under the control of an x-ray controller (30) and a motor controller (32; see Column 3, Lines 32-38) so that said collimation element is moved essentially in parallel with the said linear movement of the sensor (Figure 7).

Hseih does not specifically teach that said collimator has the help of an actuator for the movement with the source.

It would have been obvious to one of ordinary skill in the art to use an actuator to convert electrical energy from the controllers (30, 32) to mechanical energy to move the collimator in the apparatus and method of Hseih and Francke et al., since actuators are known to perform such an energy transition for electrical devices with moving parts to provide mechanical force to move said parts from electrical energy.

With respect to Claim 12, Hseih further teaches that the movement of the collimation element (508) and the linear movement of the at least one sensor (18, 504) is synchronized mechanically (Column 5, Lines 14-41).

With respect to Claims 14 and 29, Hseih further teaches that the sensors (18, 504) are arranged to be formed, at right angles to the plane formed by the scanning movement, of at least one sensor column containing two or more modules and the active surface of each of the modules also being positioned at right angles with respect to the focus of the beam (Column 3, Lines 1-12, and Figures 1-5 and 7).

With respect to Claim 19, Hseih further teaches that the apparatus includes means for linearly moving the at least one sensor (18, 504; see (Column 3, Lines 24-44) and means for tilting the at least one sensor (18, 504) by a mechanically forced control, along with the linear movement (Column 5, Lines 4-11, and Figure 6).

With respect to Claim 31, Hseih further teaches that the radiation source is stationary in space (Column 5, Lines 41-45), but arranged to be rotated (i.e., tilted) about itself (Column 4, Lines 31-33, and Column 5, Lines 41-45).

Allowable Subject Matter

Claims 4-7, 10, 11, 13, 20-23, and 25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

With respect to Claim 4, the prior art of record teaches many of the elements of the claimed invention, including the method of Claim 1, wherein said at least one sensor

is moved in such a way that the sensor is connected to a transmission element, which is moved along an essentially linear trajectory, whereby the said condition of perpendicular orientation of the sensor surface is realized.

However, prior art fails to teach or fairly suggest the method wherein said connection between said sensor and said transmission element enables mutual rotational movement of the transmission element and the at least one sensor in the direction of said linear movement, and that said perpendicular relationship realized is accomplished by tilting the at least one sensor with respect to said transmission element, in the manner required by Claim 4.

With respect to Claim 5, the prior art of record teaches many of the elements of the claimed invention, including the method of Claim 1, wherein said at least one sensor is arranged in functional connection with a control element, said control element enables altering the distance between the at least one sensor and the control element in the direction of the beam, and that the trajectory of the sensor is linear.

However, prior art does not teach or fairly suggest the method wherein said control element is moved along a curved trajectory, and that the distance between said control element and said sensor is modified during the scanning of the beam in order to achieve said linear trajectory, in the manner required by Claim 5.

With respect to Claim 10, the prior art of record teaches many of the elements of the claimed invention, including the method of Claim 1, wherein the scanning movement of the beam is realized by moving a collimation element which limits the beam.

However, prior art fails to teach or fairly suggest the method wherein said collimation element movement occurs along a curved path, the curvature of radius of which corresponds to the distance between said collimator and the focus of the radiation source, in the manner required by Claim 10.

With respect to Claim 11, the prior art of record teaches many of the elements of the claimed invention, including the method of Claim 9, wherein the radiation source is swiveled and the scanning movement of the beam is realized by said collimation element.

However, prior art fails to teach or fairly suggest the method wherein said collimation element is in mechanical contact with the swiveling movement of the radiation source, in the manner required by Claim 11.

With respect to Claim 13, the prior art of record teaches many of the elements of the claimed invention, including the method of Claim 1, wherein the movement of the collimation element and the at least one sensor in the direction of the scanning movement of the beam is synchronized.

However, prior art fails to teach or fairly suggest the method wherein the synchronization is achieved by connecting the sensor mechanically to a swiveling movement of the radiation source, in the manner required by Claim 13.

With respect to Claim 20, the prior art of record teaches many of the elements of the claimed invention, including the apparatus of Claim 16, wherein said apparatus includes a transmission element arranged to be connected to the at least one sensor

and means for linearly moving the transmission element and for tilting the at least one sensor in the direction of said linear movement.

However, prior art fails to teach or fairly suggest the apparatus wherein said sensor tilting takes place in relation to said transmission element, in the manner required by Claim 20.

With respect to Claim 21, the prior art of record teaches many of the elements of the claimed invention, including the apparatus of Claim 16, wherein the apparatus includes a control element arranged to be moved along a trajectory in the direction of the scanning movement of the beam, which control element is arranged in a functional connection with said at least one sensor in such a way that their distance in the direction of the beam is adjustable.

However, prior art fails to teach or fairly suggest the apparatus wherein said trajectory is a curved trajectory, in the manner required by Claim 21.

With respect to Claim 25, the prior art of record teaches many of the elements of the claimed invention, including the apparatus of Claim 16, wherein the apparatus includes means for moving a collimator element that limits the beam along a path.

However, prior art fails to teach or fairly suggest the apparatus wherein said collimation element movement occurs along a curved path, the curvature of radius of which corresponds to the distance between said collimator and the focus of the radiation source, in the manner required by Claim 25.

Claims 6, 7, 22, and 23 would be allowable by virtue of their dependency upon Claims 4, 5, and 21.

Response to Arguments

Applicant's arguments with respect to claims 1-29 and 31 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent Documents to: Gur et al. (US 4,203,037), Pfeiler (US 4,398,302), Spillman et al. (US 4,628,356), Scheid et al. (US 5,164,976), Hell et al. (US 6,164,820), Eberhard et al. (US 2003/0194050 A1), Ohara (US 2004/0151277 A1).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anastasia Midkiff whose telephone number is 571-272-5053. The examiner can normally be reached on M-F 7-4.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Glick can be reached on 571-272-2490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov.

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ASM
01/03/08

EDWARD J. GLICK
SUPERVISORY PATENT EXAMINER